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U.S. House of Representatives
Committee on Government Reform
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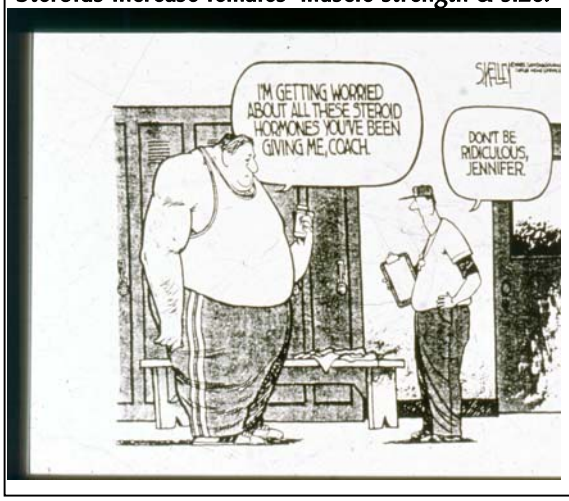
Steroids increase females' muscle strength & size.



Thank you for inviting me to participate in this important Hearing that extends your Committee's work concerning sports and drug use to young women. I am a Professor of Medicine at the Oregon Health & Science University. I have worked with the World Health Organization, the White House Office of National Drug Control Policy, the U.S. Department of Education, the Hormone Foundation and the U.S. Olympic Committee to create greater awareness of and deter drug use in sports. In addition, I am a Doping Control Officer for the U.S. Anti-Doping Agency (USADA) and understand and support drug testing among elite athletes. Of particular relevance for this Hearing is that with my colleague, Linn Goldberg, M.D., and aided by National Institute on Drug Abuse (NIDA) support, we developed the sport team-centered ATLAS (Athletes Training & Learning to Avoid Steroids) program for male athletes and the ATHENA (Athletes Targeting Health Exercise & Nutrition Alternatives) program to deter drug use among female student-athletes (1-3).

What Are Anabolic Steroid Effects for Females?

Testosterone has a critical role in promoting male characteristics, and its presence is in part responsible for differences between men and women. Testicles make testosterone, which changes boys to men, and ovaries produce estrogen, which transforms girls to women. During puberty a young man's testosterone level increases 40-fold.

Despite production differences, men and women both respond to testosterone and estrogens. Because a woman's testosterone level is two percent of normal men's level, lower doses of anabolic steroids can have marked muscle-building effects. Anabolic steroids are made to order for females wanting to attain lean, muscular physiques and increased athletic abilities. Their effectiveness resulted in steroid administration to young female competitors in former Eastern block countries and the gold medals that ensued (4). Potential additional steroid benefits include feeling more aggressive and heightened libido.

Table 1. Effects of Women's Anabolic Steroids (AS) Use

	9 weight lifters *	10 body-builders**
Ave. duration AS use	4 yrs	2 yrs
↑ muscles size & strength	100%	100%
Voice deepening#	100%	100%
↑ facial hair	N/A	90%
Clitoral lengthening	100%	80%
↓ body fat	N/A	80%
↑ aggressiveness	100%	80%
↑ body hair	100%	50%
↑ libido	100%	60%
↓ breast size	N/A	50%
Severe acne	N/A	60%
↓ scalp hair	N/A	20%
Menstrual irregularities	N/A	80%

N/A = not available #occurs within weeks and is irreversible; *Malarkey, et al. (6); **Strauss, et al. (7)

Steroid use also has side effects for females. Its illicit use is difficult to study, and available information comes from female transsexuals treated with testosterone during gender reassignment (5), and small series of admitted female steroid users. The changes that occur are listed in Table 1. Females also develop unhealthy 'male' blood cholesterol levels (6, 7) and would be susceptible to the many adverse consequences reported among male steroid users shown in Table 2.

Table 2. Adverse Effects of Anabolic Steroid Use for Men & Women

- Growth stunting among youth
- Cardiovascular, kidney and liver disease
- Blood clotting and cholesterol disorders
- Tumors
- Psychological disturbances (uncontrolled aggression to suicidal depression)
- Development of male characteristics (females)
- Breast development & testicular atrophy (males)
- Needle sharing & risk HIV/AIDS, hepatitis and other infections.

How Does Body Image Relate to Steroid Use?

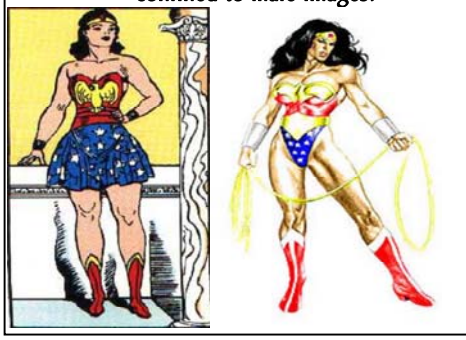
Beginning in adolescence, factors affecting the initiation and consequences of drug use differ for males and females, which is why gender-specific prevention and treatment programs appear more effective. Sex-role stereotyping and promotion of a body type that is neither healthy nor feasible support a $50 billion dollars/year self-improvement and fashion industry. The unrelenting pressure to lower body weight is a factor that may lead to disordered eating and use of body-shaping drugs (8).

Americans see an average of 3000 ads/day. Today's models are 23% thinner than the average woman.

Today, a lean more muscular appearance is a standard of both beauty and sports performance, and that combined pressure may place young female athletes at greater risk for disordered eating and use of body-shaping drugs, (e.g., diuretics, laxatives, diet pills, amphetamines and anabolic steroids). Eating disorders have become a major problem and are the third most common chronic illness among adolescent females (9). Disordered eating is present among all sports and is not confined to those encouraging a slender, immature body type or those that are judged and not refereed (10). Unfortunately, programs to prevent these body-shaping practices largely have been unsuccessful or paradoxically, may have increased these detrimental behaviors (11, 12).

Advertisers target women's weight concerns to sell their products. What the ads say, and what they should say.

Today's lean muscular bodies are not confined to male images.



Who Are the Young Women Using Anabolic Steroids?

Recent attention has been drawn to young women's anabolic steroid use. During the 1990s, three large national studies found a doubling of adolescent females' steroid abuse (13-15). Every other year the Youth Risk Behavior Surveillance System, sponsored by the Centers for Disease Control (CDC), assesses a national sample of approximately 15,000 ninth through 12th graders. Findings from the most recent 2003 data indicate that more than seven percent of ninth grade girls reported prior anabolic steroid use (16), a level comparable to young males. While seven percent is higher than other surveys, true rates may be difficult to determine. Women tend to use drugs alone and are better able to conceal drug use. The potential shame and stigma of steroid use may lead to a bias to under report its use.

Our own research and additional analysis of the YRBS 2003 data indicate that there appear to be two groups of young women anabolic steroid users. The first and larger subset uses steroids once or a few times. These girls have more disordered eating behaviors and weight loss drug use. Most are not in school sports. A common misconception is that young women with disordered eating are 'good girls,' who obey all the rules. In general, disordered eating habits cluster with other health harming actions, including drug use. The sequence may be that girls have low self-esteem, feel depressed and engage in disordered eating, then progress to alcohol and other drug use. Consistent with that progression, these young women have higher rates of using

all drugs. They use more alcohol, tobacco, marijuana and each other substance assessed; they also have more sexual partners. As you might predict, they also have greater risks and fewer protective factors for drug use.

The second group, approximately a third of female users, report taking these agents 20 or more times, and for them, steroid use may be for protection. Many carry guns and have missed school because they felt unsafe; half are trying to gain weight. Depression is common, and almost half of these high-end female users have attempted suicide in the last 12-months.

What Does ATHENA Do?

In general, students involved in any extra-curricular activity have slightly lower rates of drug use. For young women, being in sports neither markedly protects from nor promotes drug use (Table 3). What being in sports does is provide a setting ideal for promoting healthy lifestyles and learning skills that will deter drug use and other health-harming behaviors. Sports teams usually are gender specific, with an influential coach and bonded peers. Team practices are familiar settings for learning skills and means to be better athletes. We took advantage of these features with the ATLAS and ATHENA drug use prevention and health promotion programs.

During the sport season, these programs are incorporated into a team's usual practice activities. Each ATHENA session is peer-led with fun tasks addressing effects of drugs on athletes, depression prevention, the media, healthy sport nutrition and strength training.

Table 3. Lifetime Drug Use Female High School Students

	♀ Athletes	All ♀
Alcohol	50%	60%*
Cigarettes	30%	45%*
Marijuana	20%	30%*
Diet pills	15%	10%**

*Monitoring the Future **Youth Risk Behavior

ATHENA was studied with NIDA-funding among 40 sport teams from 18 high schools in Oregon and Washington. Following the program, girls in ATHENA had less new and ongoing diet pill use and less new use of athletic enhancing substances (anabolic steroids, amphetamines and sport supplements). They also reported less riding in a car with a drinking driver, less sexual activity and fewer injuries. They ate better and could strength train more effectively. We continued to follow these young women and assessed them again one-year after high school graduation. ATHENA graduates reported less alcohol and drug use. Those long-term findings show that directly focusing on risk factors and healthy decision-making skills truly has a lasting impact.

ATHENA Outcomes

Health Harming Behaviors
- ↓ New & ongoing diet pill use
- ↓ New use amphetamines, steroids & supplements
- ↓ Riding with drinking driver
- ↓ New sexual activity

Health Promoting Effects
- ↑ Healthy eating (calcium, protein)
- ↑ Confidence strength training
- ↑ Refusal skills
- ↑ Ability to control mood
- ↓ Belief in the media
- ↓ Injuries

Long-term Outcomes
- ↓ Alcohol use
- ↓ Tobacco use
- ↓ Marijuana use

Will the Clean Sports Act Benefit Young Women?

During the last thirty years, since Title IX, women's sport participation has increased eight-fold. Today scholarships and even an occasional career as a professional athlete are attainable goals for women. Elite female athletes are not immune from performance enhancing drug use. In 2004, the number of USADA doping violations was comparable for men and women, and a requirement for clean sports is applicable for all.

While there may be parity in sport participation and college scholarships, the financial and career potential of professional sports is much less for women. There are no women on Forbes list of the 50 highest paid athletes, and most people would find it difficult to name five active professional women athletes.

Any effort to reduce drug use is laudable. I support drug testing among professional sport, and I am a Doping Control Officer for USADA because I believe athletes should not be pressured to use drugs to compete. However, I have outlined the factors leading to young women's drug use, and drug testing Olympic or professional athletes will not impact on those risks.

It also is unrealistic to think that drug testing professional athletes will clean up boys' locker rooms. Elite athletes are but one influence on young males performance enhancing drug use. Adolescents know steroids work and are potentially harmful or you would not be holding these Hearings. Perhaps some superior athletes will know that they do not have to take steroids to compete in professional sports. However, many young athletes are not thinking just about their college and potential professional careers. They feel invulnerable and want a short cut to looking better next week and playing better next weekend. That is why effective education is a critical drug prevention component. Most adolescents also do not tap into their potential from sport nutrition and appropriate training. Proven programs such as ATLAS, which present immediately relevant risks and effective alternatives, can deter use of anabolic steroids, alcohol and other drugs, and provide healthy behaviors and skills that can last a lifetime.

SUMMARY

Drugs are bad. Sports are good. It is commendable that Committee members have shown your concern for America's youth and recognize that drug use by minors is a problem of national significance. Reducing drug use among professional athletes sends a message that steroids and other performance enhancing drugs are not tolerated. However, it will not impact young women's steroid use, and for young men, it is a mixed message, especially when a winning at all cost attitude and potential rewards for achievement are so great. Last year Congress amended the Controlled Substances Act with the Steroid Control Act, which President Bush signed in October. It included provisions to fund science-based drug use prevention education for children and adolescents. To date, those funds have not been appropriated. Just say no, just does not work. Sport teams have untapped potential as settings to positively impact behaviors. Funding the Steroid Control Act that you already passed will go a longer way toward getting drugs out of youth sports and allow programs with proven success to strengthen sports' health-enhancing mission.

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